Random Variables Checkpoint

These questions refer to the following information:

Suppose the scores on an exam are normally distributed with mean μ = 75 points, and standard deviation σ = 8 points.

Question (1)

The instructor wanted to "pass" anyone who scored above 69. What proportion of exams will have passing scores?

A: .25
B: .75
C: .2266
D: .7734
E: -.75

Feedback

A : 0

✗ This is not quite right. You want to find the proportion of exams that have above 69 points. This is equivalent to finding the probability that a given exam has at least 69 points. Consider the remaining options. (D) is the right answer.

B : 0

✗ This is not quite right. You want to find the proportion of exams that have above 69 points. This is equivalent to finding the probability that a given exam has at least 69 points. Consider the remaining options. (D) is the right answer.

C : 0

✗ This is not quite right. It seems that you have found the proportion of exams that will not have scores above 69 points. You want to find the proportion of exams that will have scores above 69 points. Consider the remaining options. (D) is the right answer.

D : 10

✔ Good job! Let the random variable ***X*** represent the score on the exam. We are given that ***X*** is normal, with a mean of 75 and standard deviation of 8, and need to find P(X < 69).

E : 0

✘ This is not quite right. The z-score for 69 points is -0.75. However, this is not the proportion of exams that passed. Remember that a proportion canâ€™t be negative. You should find P(***Z*** > -0.75). Consider the remaining options. (D) is the right answer.

Question (2)

What is the exam score for an exam whose z-score is 1.25?

A: 65
B: 75
C: 85
D: .8944
E: .1056

Feedback

A : 0

✘ This is not quite right. Since the z-score is positive, the exam score associated with this z-score should be greater than the mean exam score. Consider the remaining options. (C) is the right answer.

B : 0

✘ This is not quite right. Since the z-score is positive, the exam score associated with this z-score should be greater than the mean exam score. Consider the remaining options. (C) is the right answer.

C : 10

✔ Good job! A z-score of 1.25 means that the actual exam score is 1.25 standard deviations above the mean, and therefore the exam score we are looking for is: mean + 1.25 * SD = 75 + 1.25 * 8 = 85.

D : 0

✘ This is not quite right. It seems that you have found the proportion of exams that have an associated z-score of at most 1.25. However, you should find the exam score associated with a z-score of 1.25. Consider the remaining options. (C) is the right answer.

E : 0

✘ This is not quite right. It seems that you have found the proportion of exams that have an associated z-score of at least 1.25. However, you should find the exam score associated with a z-score of 1.25. Consider the remaining options. (C) is the right answer.

Question (3)

Suppose that the top 4% of the exams will be given an A^+. In order to be given an A^+, an exam must earn at least what score?

A: 61
B: 73
C: .516
D: 77
E: 89

Feedback

A : 0

✘ This is not quite right. The top 4% of exam scores should have a minimum exam score of at least the mean of all exam scores. Consider the remaining options. (E) is the right answer.

B : 0

✗ This is not quite right. The top 4% of exam scores should have a minimum exam score of at least the mean of all exam scores. Consider the remaining options. (E) is the right answer.

C : 0

✗ This is not quite right. It seems that you have found the proportion of exams that have a score of at most 79 points. However, you should find the minimum exam score that would allow an exam to earn an A^+. Consider the remaining options. (E) is the right answer.

D : 0

✗ This is not quite right. It seems that you have found the minimum exam score in order for an exam to be in the top 40% of all exam scores. However, you should find the minimum exam score that would allow an exam to earn an A^+. Consider the remaining options. (E) is the right answer.

E : 10

✓ Good job! We need to find the exam score such that the probability of getting a score above it is 0.04. Equivalently (and more practically, given the way our table works) we need to find the exam score such that the probability of getting a score below it is 1 â€“ 0.04 = 0.96. Looking in the body of the table for the table entry that is closest to 0.96 (which is 0.9599) we learn that the exam score that we are looking for has a z-score of 1.75. This means that the exam score that we are looking for is 1.75 * SD above the mean, and therefore is: 75 + 1.75 * SD = 75 + 14 = 89.